

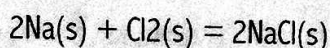
## Endothermic and Exothermic Reactions Activity

Name \_\_\_\_\_  
Period \_\_\_\_\_ Date \_\_\_\_\_

Please read the passage below and highlight the information that shows what an endothermic and exothermic reaction are and what the evidence occurs for each type during the reaction itself.

Many chemical reactions release energy in the form of heat, light, or sound. These are exothermic reactions. Exothermic reactions may occur spontaneously and result in higher randomness disorder of the system. They are denoted by a negative heat flow (heat is lost to the surroundings), exothermic reactions produce heat or may even be explosive.

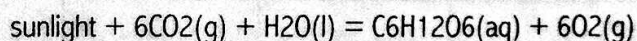
An example of an exothermic reaction is the mixture of sodium and chlorine to yield table salt. This reaction produces 411 kJ of energy for each mole of salt that is produced:



There are other chemical reactions that must absorb energy in order to proceed. These are endothermic reactions.

Endothermic reactions cannot occur spontaneously. Work must be done in order to get these reactions to occur. When endothermic reactions absorb energy, a temperature drop is measured during the reaction. The heat energy is used to create changes in the chemical bonding of the substances. Endothermic reactions are characterized by positive heat flow (into the reaction).

Photosynthesis is an example of an endothermic chemical reaction. In this process, plants use the energy from the sun to convert carbon dioxide and water into glucose and oxygen. This reaction requires 15MJ of energy (sunlight) for every kilogram of glucose that is produced:



### Activity: Observing Heat Energy Exchanges in Chemical Reactions

Predict: What kind of energy change will you observe in these reactions? (endothermic or exothermic)

Hydrogen Peroxide and Potato:

Hydrogen Peroxide and Yeast:

Baking soda and Vinegar

Epsom Salts and Water

Rock Salt, Baking Soda and Water

Calcium Chloride and Water

Ammonium Nitrate and Water

#### Materials:

6 Test Tubes

50mL Hydrogen Peroxide

10 g Calcium Chloride

Rock Salt

Test Tube Rack

50mL Vinegar

Small Piece Potato

Distilled Water

Spoon

Safety Goggles

Dry Yeast

Graduated Cylinder

Baking Soda

10g Ammonium Nitrate

Procedure:



**Endothermic and Exothermic Reactions Activity**

Name \_\_\_\_\_

Period \_\_\_\_\_ Date \_\_\_\_\_

1. Put on safety goggles.
2. Set up test tube rack with 7 test tubes
3. Add 10mL of hydrogen peroxide to test tube #1. Record the starting temperature of the liquid.
4. Add a small piece of potato to the hydrogen peroxide. Feel the bottom of the test tube and record your observations. Record the final temperature of the mixture.
5. Repeats steps 3 and 4 for
  - a. 10 mL of hydrogen peroxide +  $\frac{1}{2}$  tsp. of yeast
  - b. 10 mL of vinegar +  $\frac{1}{2}$  tsp of baking soda
  - c. 10mL of distilled water +  $\frac{1}{2}$  tsp of Epsom salts
  - d. 10 mL of distilled water +  $\frac{1}{2}$  tsp rock salt +  $\frac{1}{2}$  tsp baking soda
  - e. 5 g of Calcium Chloride and 10 mL distilled water
  - f. 5 g Ammonium Nitrate and 10 mL distilled water

Data:

	Observations	Starting Temp.	Ending Temp	Change in Temp
Hydrogen Peroxide and Potato				
Hydrogen Peroxide and Yeast				
Baking soda and Vinegar				
Distilled water and Epsom Salts				
Distilled water/ Rock salt/ Baking Soda				
Calcium Chloride/Water				
Ammonium Nitrate/Water				

Analysis:

Classify each situation above as an endothermic or exothermic reaction.

What criteria did you use to classify each reaction?

How do the reactions in the last two test tubes compare to those in the first five? Why do you think there may be a difference?